



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,584	07/29/2003	Robert J. Steger	LAM-PI093 (032747-000032)	1627
49713	7590	11/26/2008	EXAMINER	
LAM - THELEN LLP P.O. BOX 640640 SAN JOSE, CA 95164-0640			ARANTIBIA, MAUREEN GRAMAGLIA	
			ART UNIT	PAPER NUMBER
			1792	
			MAIL DATE	DELIVERY MODE
			11/26/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/630,584

Applicant(s)

STEGE, ROBERT J.

Examiner

Maureen G. Arancibia

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 31-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 31-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-7, 9, 10, and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of U.S. Patent Application Publication 2003/0137249 to Nakano et al.**

In regards to Claims 1, 4, 6, 9, 10, and 31-34, AAPA teaches a plasma processing reactor (Figure 1 of the instant application) comprising: a chamber 102 having a substrate support 106 asymmetric about a vertical axis of said chamber (Paragraphs 5-7 of the instant application); and an RF power supply 114 coupled to said chamber, said RF power supply adapted to supply RF power to said chamber to generate a plasma therein (Paragraphs 5-7 of the instant application).

It is noted that substrate support 106 would be structurally capable of being removed from the chamber, as broadly recited in the claims, based on a user's ability to disassemble the apparatus (using a variety of tools) in whatever manner desired. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does

not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim.

AAPA does not expressly teach that an electrically resistive material, such as copper, is selectively coated on the substrate support, the chamber wall, or both, in various shapes, such as a plurality of film strips azimuthally positioned, so as to vary the RF impedance azimuthally; the electrically resistive material having an RF impedance different from an underlying base material of said chamber.

Nakano et al. teaches a plasma processing reactor (ex. Figure 1) comprising: a chamber 21 having a substrate support 8 about a vertical axis of said chamber (ex. Paragraph 53); a RF power supply 1 coupled to said chamber, said RF power supply adapted to supply RF power to said chamber to generate a plasma therein (ex. Paragraphs 48-53); and a coating of electrically resistive material such as copper selectively plated (*a copper plate Cu is bonded to the surface*; Paragraph 73) on the substrate support 8, the chamber wall 10, or both (*one or more...paths, which run from the susceptor electrode 8 to the RF generator 1*; Paragraph 74) in various shapes, such as a plurality of film strips azimuthally positioned, each comprising a continuous film, (*one or more linear or zonal low-resistance conductive paths*) so as to vary the RF impedance azimuthally, the electrically resistive material having an RF impedance different (*lower*) from an underlying base material of said chamber (see at least Paragraphs 13-20 and Paragraph 74)

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by AAPA to selectively coat an electrically resistive material, such as

Art Unit: 1792

copper, on the substrate support, the chamber wall, or both in various shapes, such as a plurality of film strips azimuthally positioned, each strip comprising a continuous film, so as to vary the RF impedance azimuthally; the electrically resistive material having an RF impedance different from an underlying base material of said chamber, as taught by Nakano et al. The motivation for making such a modification, as taught by Nakano et al. (see at least Paragraphs 13-20 and 74), would have been to make the impedances on the surface of the chamber symmetrically equal, so as to reduce loss of the RF power supplied to the plasma generation space and prevent variation in the plasma density.

Further in regards to at least Claims 1 and 33, it is noted that the continuous strip of copper on the substrate support and the chamber wall taught by the combination of AAPA and Nakano et al. is considered to meet the recitation of a film coated on said components, since it forms a relatively thin plated coating on the components. The claimed material recited to be a film formed by coating therefore appears to be the same as or similar the plated copper taught by the combination of AAPA and Nakano et al. Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product.

In regards to Claims 2, 3, and 5, Examiner takes official notice that the composition and thickness of an electrically resistive material directly affect its characteristic impedance.

It would have been obvious to one of ordinary skill in the art, through routine experimentation, with a reasonable expectation of success, to further modify the apparatus taught by the combination of AAPA and Nakano et al. to vary the composition and thickness of the strips of electrically resistive material, as result-effective variables, in order to locally optimize the RF impedance of each of the strips of electrically resistive material, for the predictable result of symmetrically equalizing the impedances on the surface of the chamber and preventing variation in the plasma density.

In regards to Claim 7, the electrically resistive material in the combination of AAPA and Nakano et al. is selectively applied prior to performing any processing in the chamber. The apparatus taught by the combination of AAPA and Nakano et al. would be structurally capable of performing processing on a portion of a surface of the removable substrate support with the chamber, as broadly recited in the claim, by simply not covering the substrate support with a substrate. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim.

3. Claims 8 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Nakano et al. as applied to Claim 1, and further in view of U.S. Patent 6,706,138 to Barnes et al.

The teachings of AAPA and Nakano et al. were discussed above.

In regards to Claims 8 and 35, the combination of AAPA and Nakano et al. does not expressly teach that the electrically resistive material alternatively has an RF impedance higher than that of the underlying base material, or that it could specifically include nickel.

Barnes et al. teaches that an impedance adjusting member 265 can have an RF impedance higher than that of the underlying base material. Barnes et al. further teaches that the impedance adjusting member 265 can be made of nickel. (Column 7, Line 37 - Column 8, Line 3)

In regards to Claim 35, it would have been obvious to one of ordinary skill in the art to alternatively modify the electrically resistive material of AAPA and Nakano et al. to have an RF impedance higher than that of an underlying base material, as suggested by the teachings of Barnes et al. The motivation for making such a modification, as taught by Barnes et al. (Column 7, Line 37 - Column 8, Line 3), would have been to minimize an RF path to ground, thereby better containing the plasma and reducing plasma damage to the chamber wall.

In regards to Claim 8, it would have been *prima facie* obvious to one of ordinary skill in the art to have the electrically resistive material include nickel, as an art-recognized suitable material for use in adjusting impedance on a chamber wall, as taught by Barnes et al. It has been held that the selection of a known material based on its suitability for its intended use is *prima facie* obviousness.

4. Claims 36-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Nakano et al. and Barnes et al.

In regards to claims 36-39, the teachings of AAPA and Nakano et al. are applied to Claims 36-39 as applied to Claims 1 and 31-34 above.

Further in regards to Claim 36, the combination of AAPA and Nakano et al. does not expressly teach that the electrically resistive material alternatively has an RF impedance higher than that of the underlying base material.

Barnes et al. teaches that an impedance adjusting member 265 can have an RF impedance higher than that of the underlying base material. (Column 7, Line 37 - Column 8, Line 3)

It would have been obvious to one of ordinary skill in the art to alternatively modify the electrically resistive material of AAPA and Nakano et al. to have an RF impedance higher than that of an underlying base material, as suggested by the teachings of Barnes et al. The motivation for making such a modification, as taught by Barnes et al. (Column 7, Line 37 - Column 8, Line 3), would have been to minimize an RF path to ground, thereby better containing the plasma and reducing plasma damage to the chamber wall.

In regards to Claim 40, Examiner takes official notice that the exact shape and extent of the electrically resistive material will directly affect the impedance of the RF path to ground.

It therefore would have been obvious to one of ordinary skill in the art, through routine experimentation, with a reasonable expectation of success, to further modify the apparatus taught by the combination of AAPA, Nakano et al., and Barnes et al. to vary the shape of the strips of electrically resistive material, to arrive at the claimed shape of

Art Unit: 1792

a rectangle having a larger side perpendicular to the plane of the substrate support, the shape of the strip being a result-effective variable, in order to locally optimize the RF impedance of the RF path to ground formed by each of the strips of electrically resistive material, for the predictable result of symmetrically equalizing the impedances on the surface of the chamber and preventing variation in the plasma density.

Response to Arguments

5. Applicant's arguments filed 15 August 2008 have been fully considered but they are not persuasive.

Specifically, in regards to Applicant's argument that the combination of AAPA and Nakano et al. does not teach the claimed coating, Examiner must disagree. Nakano et al. teaches a coating of electrically resistive material such as copper selectively plated (*a copper plate Cu is bonded to the surface*; Paragraph 73) on the substrate support 8, the chamber wall 10, or both (*one or more...paths, which run from the susceptor electrode 8 to the RF generator 1*; Paragraph 74) in various shapes, such as a plurality of film strips azimuthally positioned, each comprising a continuous film, (*one or more linear or zonal low-resistance conductive paths*). Examiner has shown above why it would have been obvious to one of ordinary skill in the art at the time of the invention to include the coating of Nakano et al. in the apparatus of AAPA. The continuous strip of copper on the substrate support and the chamber wall taught by the combination of AAPA and Nakano et al. is considered to meet the recitation of a film coated on said components, since it forms a relatively thin plated coating on the components. The claimed material recited to be a film formed by coating therefore

Art Unit: 1792

appears to be the same as or similar the plated copper taught by the combination of AAPA and Nakano et al. Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product.

It is noted that Applicant failed to respond to the rejection of Claim 8 as obvious in view of the teachings of AAPA in view of Nakano et al., and further in view of Barnes et al. It is further noted that anything lacking in the combination of AAPA and Nakano et al. as pertains to the amended claims is remedied by the teachings of Barnes et al., as set forth in detail above.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1792

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571)272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Maureen G. Arancibia/
Examiner, Art Unit 1792

/Parviz Hassanzadeh/
Supervisory Patent Examiner, Art Unit 1792